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ABSTRACT

The hypotheses that there will be a significant difference (1) in the number of responses generated according to economic issues, (2) in the number of responses generated according to social issues, (3) in the number of responses generated between the category of economic issues and the category of social issues, (4) in cue ranking by response frequency between economic and social issues, (5) in cue ranking of importance by subjects on economic and social issues, and (6) subject ranking of cue importance and frequency of cue importance on economic and social issues were tested in this study. Three social issues (gun control, student busing, and air pollution) and three economic issues (unemployment, government loans to big business, and wage and price control) were chosen. A total of 45 college freshmen responded to the social issues, and 45 freshmen responded to the economic issues. After the subjects responded to all of the issues, their responses were collected and the subjects were given a list of cues and were asked to rate each cue in terms of its importance in generating responses. The results indicated that cues tend to be topic bound and that there is a correlation between perception of cue importance and actual use of cue in generating responses. (WR)

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CUE SET STIMULATION AS A FACTOR IN HUMAN RESPONSE GENERATION

John L. Petelle

The notion that the human organism has a propensity to categorize is one which goes back at least to the time of Aristotle. In fact, the Aristotelian concept of "categories" and "category systems" does much to undergird modern empirical theory in this area. That man does have a tendency to categorize and cluster his information is a concept which has been demonstrated by such modern researchers as Mandler and Pearlstone,[2] Coffer[3] and Charles Osgood,[4] to mention but a few. The use of cueing systems as a strategy in human information retrieval has been an area of research investigated by a number of psychologists and social psychologists.[5] More recently some of the characteristics of human recall have been investigated by Bruder[6] et al. That the use of a cue system is superior to free recall in human retrieval is probably a matter no longer in question. The emphasis, however, in research in this area has been upon the use of cue systems to evaluate human recall of stored information. Little investigation has been concerned with the use of cue systems in initiating human response generation and/or in improving human problem-solving. It is worth noting, that in the June, 1972 (p. 4) issue of Spectra, Earl Wallace stated that a renewed interest on the part of the rhetorician in the ancient concept of invention is indicated in his ". . . new concern for invention, i.e., for systems of topics that aid in recalling experience during moments of utterance and that direct search and inquiry into what is needed and not ready at hand."[7]

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The use of symbolic cue systems is then, a retrieval strategy, utilizing language as the primary stimulus to effect conceptual behavior. That there is a relationship between thought processes and language processes has been pointed out by Staats,[8] as well as by Nelson who has maintained that "cognitive activity is related to language categories. . ."[9] Nelson has extended such thinking to research in speech communication by pointing out that "The Problem now is one of equating the superordinates of language and cognitive categories with those superordinates emanating from the classification schemes for ideas and arguments."[10] In a subsequent article, Nelson stated, "Topoi are viable classifiers regardless of subject matter, and they are generalizable in all cases."[11] Using the Wilson and Arnold topical system,[12] Nelson demonstrated that subjects using the cued recall system generated more responses to highly meaningful issues than did subjects using a free-recall strategy. That the Wilson and Arnold cue system, or any other cue system for that matter, has such a degree of universalness as suggested by Nelson seems suspect to this experimenter. Questions which immediately come to mind are: (1) Are all cues in a cueing system viable contributors to the improvement of information retrieval? (2) Are the majority of responses generated the result of a limited number of cues? (3) Are some of the cues more appropriate for some topics than for others? (4) Is there a correlation between subject perception of cue importance and subject response generation according to cues? Based upon considerations such as these, the following hypotheses were formulated:

1. There will be a significant difference in number of responses generated according to economic issues.

2. There will be a significant difference in number of responses generated according to social issues.

3. There will be a significant difference in number of responses generated between the category of economic issues and the category of social issues.

4. There will be a significant correlation in cue ranking by response frequency between economic and social issues.

5. There will be a significant correlation in cue ranking of importance by subjects on economic and social issues.

6. There will be a significant correlation between subject ranking of cue importance and frequency of cue importance on economic and social issues.

PROCEDURES

The experiment proceeded according to two phases.

Phase I

Inasmuch as most problem solving seems to involve issues of either a social or economic nature, three social and three economic issues were chosen. The primary criteria utilized in the choice of these issues was that the experimenter believed them to be of high interest to the student as well as being currently relevant. The social issues chosen were gun control, student busing, and air pollution; the economic issues selected were unemployment, government loans to big business, and wage and price control. Phase I of the experiment consisted of using the Wilson and Arnold System. A total of 45 subjects responded to the social issues, and 45 subjects responded to the economic issues. The subjects were mostly freshmen students enrolled in the fundamentals program during the fall semester, 1971, at the University of Nebraska-Lincoln. For convenience of administration of the experiment, the 8:30, 9:30 and 10:30 sections were arbitrarily chosen. The instructions given the subjects were as follows:

At the bottom of this sheet you will find a concept underlined. Directly beneath the underlined concept will be a "cue" term. Using that term as a cue to generate responses to the concept, generate as many one-word responses as you can. You will have one minute to generate these responses. For example:

Compulsory Health Insurance

Existence

1. Life
2. Death
3. Hospital
4. Illness
5. Protective
6. Preventive

You see the concept, Compulsory Health Insurance. beneath that concept is the "cue" term--existence. Using the term, existence when you see the concept, Compulsory Health Insurance, what responses relative to Compulsory Health Insurance immediately come into your mind. Do not stop to evaluate these responses; merely write them down. The above example indicates that when using the term, existence, as a means to generate responses about Compulsory Health Insurance, the above person generated the responses of life, death, etc. When your instructor tells you to turn the page, do so and begin. Remember, you have one minute to generate as many one-word responses to the underlined concept as you can.

Phase II of the experiment proceeded as follows: After the subjects had responded to all of the issues, their responses were collected and they were handed the list of cues and given the following instructions:

You have used 16 different "cues" in generating responses to a concept. Please rate each of the "cues" in terms of its importance to you in generating responses. Use the following code:

Code	Importance
1	Very minor
2	Low
3	Average
4	High
5	Extreme

RESULTS

A one-way analysis of variance on the economic issues yielded an F of 48.44 ($p < .05$; [insert Table 1]). Tukey's Honestly Significant Difference Test was then applied between each of the economic issues. The results revealed significant differences ($p < .05$) between two of the issues [insert Table 2] . Hypothesis Number I was thus supported. A one-way analysis of variance was then run on the social issues and yielded an F of 5.08 ($p < .05$ [insert Table 3]). Tukey's HSD Test was then applied between each of the social issues with one significant difference found ($p < .05$; [insert Table 4]). Hypothesis Number II was thus supported. A comparison of group means on the categories of economic issues and social issues yielded a "t" of 2.60 ($p < .05$; [insert Table 5]). Hypothesis Number III was thus supported.

The sixteen cues were then ranked from one through sixteen on the basis of the number of responses each generated on economic and social issues. Spearman's rank order correlation coefficient was then utilized and an r_s of .765 was found (t=5.90). Hypothesis Number IV, therefore, received support. A Spearman rank order correlation coefficient was then run on the subject rankings of cue importance on economic and social issues (r_s .893; t=8.36). Hypothesis Number V also received support. A Spearman rank order correlation coefficient was then applied to the cue ranking of importance by subjects on economic and social issues and number of responses generated by cues on economic and social issues (Economic: r_s .741; t=5.67; $p < .05$; Social: r_s .660; t=5.10; $p < .05$). Hypothesis Number VI was, then, supported.

INTERPRETATION OF RESULTS

The interpretation of results is difficult in light of the statistical analysis. The significant ANOVA and subsequent significant Tukey's conducted on the frequency of cue response on economic issues would lead one to believe that perhaps the cues are topic bound. That is, the Wilson and Arnold cue set is more viable as an aid in response generation for some topics than for others. While only one significant difference was found between the social issues, the same conclusion might be drawn. The significant difference between the categories of economic issues and social issues further substantiates this interpretation. That more significant differences occurred between the economic issues than the social issues and a greater number of responses were generated among the social issues might indicate, that as a cue set, the Wilson and Arnold cue system is more viable for socially oriented issues. In inspecting the data more closely, additional insight was gained. In terms of total number of responses generated according to cue, the three most productive cues on both economic and social issues were the cues of existence, possibility--impossibility and form. Furthermore, the three least productive cues in terms of frequency of response on both economic and social issues were the cues of correlation, feasibility and spatial. Two tentative conclusions may be drawn from this inspection. First, the perfect correlation on economic and social issues of the three most productive and three least productive cues helps explain the significant r_s between these issues. Secondly, on the basis of such high correlation between most productive and least productive cues, it might be concluded that only a part of the Wilson and Arnold cue set is necessary.

The significant r_s found on subject ranking of cue importance on economic and social issues indicates that subjects found certain cues particularly helpful on both economic and social issues. Subject rank ordering of cue importance on economic and social issues revealed that subjects ranked existence as first in importance, and desirability as second in importance. At the same time, subjects ranked the cue spatial as least in importance on both economic and social issues and the cue correlation as second lowest in order of importance.

The significant r_s between subject ranking of cue importance and the actual frequency of responses they generated according to cue can probably be explained as follows. Both subject ranking and actual number of responses resulted in the cue existence being ranked first and the cue spatial being ranked last on both economic and social issues; furthermore, the cue correlation was ranked 14 by actual frequency and 15 by subject perception of importance on both economic and social issues; and the cue possibility--impossibility was ranked 2 by actual frequency of response and 3 by subject perception of importance on economic issues and 2 and 5 respectively on social issues. Other discrepancies between ranking of frequency response and subject ranking of importance tended to be relatively small.

CONCLUSIONS

Conclusions to be drawn from this study should be considered tentative. As previous research has indicated, the use of a cue system does increase response generation. This study would indicate that (1) certain cues in the Wilson and Arnold set are more viable than others; that

there is a certain universality or greater utility among some of the Wilson and Arnold cues, but that the "set" as a whole is more restricted than Nelson suggests; (2) that the cues tend to be topic bound; (3) and that there is a correlation between perception of cue importance and actual use of cue in generating responses. A number of questions, however, still remain unanswered. For example, will subjects of high verbal ability and high integrative complexity utilize a cue system more effectively than subjects of low verbal ability and low integrative complexity? Will a subset of the Wilson and Arnold system (i.e., top four or six cues) be as productive as the entire set? Perhaps one final point should be made. This study should not be considered as a completed experiment, but rather as a part of a series of experiments designed to explore an area of human communication which has received little attention. Hopefully, questions which might be generated from this study will lead other researchers to investigate this area from a variety of dimensions. Research in these areas is currently being carried on at the UNL.

TABLE 1

Summary Table of the Analysis of Variance
Effects of Cue Systems on Economic Issues

	SS	dF	MS	F
Between groups	6755.25	2	3377.63	48.44*
Within groups	2928.44	42	69.73	

*p < .05

TABLE 2

Tukey's HSD Test between Economic Issues

	Means	Unemployment	Big Business	Wage & Price Control
Unemployment	46.733	____	23.8000*	27.7333*
Big Business	70.533		____	3.9333
Wage & Price Control	74.466			

*p < .05

TABLE 3

Summary Table of the Analysis of Variance
Effects of Cue Systems on Social Issues

	SS	dF	MS	F
Between groups	1505.86	2	752.94	5.08*
Within groups	6224.75	42	148.21	

*p < .05

TABLE 4

Tukey's HSD Test between Social Issues

	Means	Gun Control	Student Busing	Air Pollution
Gun Control	65.3999	_____	4.7334	13.9333*
Student Busing	70.1333		_____	9.2000
Air Pollution	79.3333			

*p < .05

TABLE 5

Comparison of Group Means between Economic & Social Issues

	M	SD	t
Social	71.62	13.26	2.60*
Economic	63.91	14.84	

*p < .05

FOOTNOTES

[1]Professor Petelle is Chairman of the Department of Speech and Dramatic Art, University of Nebraska--Lincoln. Thanks is also due to Mr. Earl McDowell, research assistant, who aided in some of the data preparation and to Dr. Vincent Di Salvo for his advice on some of the computer programs.

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